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L4: Entry 2 of 8

File: USPT

Oct 8, 2002

DOCUMENT-IDENTIFIER: US 6463295 B1

TITLE: Power control with signal quality estimation for smart antenna communication systems

Brief Summary Text (18):

Several prior art methods exist for estimating the quality of received signal. One class or prior art techniques uses a measure of the received signal power as a measure of the received signal quality. An example is the commonly used received signal strength indicator (RSSI). The problem with such measures is that they do not distinguish between the desired signal and any interfering signals and/or noise. To overcome this shortcoming, some prior art power control methods use a measure of the bit error rate (BER) or the easier to obtain frame error rate (FER). For example, the initial power control method used in the IS-95 CDMA standard uses FER. FER is easier to obtain in practice than the BER because cyclic redundancy check (CRC) bits usually are part of a frame structure. The FER may be viewed as an approximate indication of the BER. Two main shortcomings of BER and FER as measures include: 1. It takes a long time (many frames) to accumulate a statistically meaningful estimate of BER or FER, which may be too slow for power control; and 2. The BER (or FER) may not be only a function of power, but may also be affected by other causes of a demodulation error. For example, residual frequency offset (even after any frequency offset correction has been applied) may contribute to the modulation error.

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L1: Entry 3 of 4

File: PGPB

Nov 1, 2001

DOCUMENT-IDENTIFIER: US 20010036812 A1

TITLE: Bit error estimates from pilot signals

Summary of Invention Paragraph:

[0014] There are disadvantages associated with deriving BER using control signal information such as pilot symbols. Particularly, when a received pilot symbol is used for both channel estimation and for BER estimation, the BER estimate is biased. Biasing occurs when there is a systemic deviation or variation of a value from a reference value. The reason for this is that part of the channel estimate which originates from the symbol causes a real, positive fractional component of the transmitted symbol to be added to the estimate of the received symbol when the received symbol is corrected to account for the influence of the channel. Accordingly, BER is underestimated and therefore it does not accurately reflect the true BER.

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L2: Entry 5 of 8

File: USPT

Jun 8, 1999

DOCUMENT-IDENTIFIER: US 5910182 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Data communications systems and methods using interspersed error detection bits

Brief Summary Text (42):

The communication systems and methods of the present invention intersperse a number of known bits within the data block instead of clumping them at one end. This provides the advantages of being able to successively compute an error check indication during progression of the decoding operation, while providing a more uniform bit error probability over the data bits in the block as compared with the "tail bits" method. Moreover, the extra bits inserted need not cause an increase in data bit error rate, unlike the prior art CRC method. The present invention provides communication systems and methods providing improved error correction decoding while maintaining the benefits of error detection.

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L2: Entry 6 of 8

File: USPT

Dec 30, 1997

DOCUMENT-IDENTIFIER: US 5703877 A

TITLE: Acquisition and error recovery of audio data carried in a packetized data stream

Detailed Description Text (26):

In accordance with the preferred embodiment, audio decoder 54 will maintain synchronization through sample and bit rate changes if this feature is enabled by the decoder microprocessor 42. If the microprocessor disables sample rate changes, audio decoder 54 will conceal the audio errors in each sync frame received with a sample rate that does not match the sample rate of the sync frame on which the audio decoder last acquired, and will assume that the sample rate did not change in order to maintain synchronization. The audio decoder is required to process through bit rate changes. If an error in the bit rate information is indicated, e.g., through the use of a cyclic redundancy code (CRC) as well known in the art, audio decoder 54 will assume that the bit rate of the corresponding sync frame is the same bit rate as the previous sync frame in order to maintain synchronization. If the decoder microprocessor 42 has enabled rate changes, the audio decoder 54 will assume that the rates indicated in the sync frame are correct, will process the sync frame, and use the appropriate sync frame size in maintaining synchronization with the audio bitstream.

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L2: Entry 7 of 8

File: USPT

Sep 22, 1981

DOCUMENT-IDENTIFIER: US 4291403 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Digital implementation of parity monitor and alarm

Brief Summary Text (11):

In order to determine if a communication channel is subjected to degradation, it is necessary to determine the bit error rate, and as discussed earlier in the prior art systems, it was necessary to cease communication on a channel in order to determine the bit error rate. However, as disclosed herein, the bit error rate can be extracted from the bit error integrity. Thus, one of the critical monitoring steps in transmitting a digital data stream is that of the bit error integrity. The step necessary to implement the invention is to monitor the performance of a digital data stream by counting the number of error bits which can be detected by a parity error detector or one of the cyclic error checking code detectors that occur in the system over a defined period of time and relative to the bit error rate either declares an alarm or a no alarm condition. The mathematical relationship of the bit error integrity versus the detected bit error rate and other relationships for a digital data stream are provided herein.

Detailed Description Text (6):

FIG. 2 is a circuit diagram of the circuitry that is used to digitally implement the above discussed relationship. The error pulses as detected from a parity error checker, a cyclic error code checker or other means are used to trigger a single shot multivibrator 3 by way of conductor 1. The single shot multivibrator can be any of the commercially available devices such as an NE 555, manufactured by Signetics Corporation and other semiconductor manufacturers or any of the other single shot multivibrators that are able to meet the design specifications. Knowing the desired bit error rate threshold, the bit error rate can be determined by using FIG. 1, or the equations  $\text{.nu.} = \frac{1}{\text{.perspective} \cdot (1 + 1)}$  and  $\text{.nu.} = \left[ \frac{(\text{.eta.} \cdot 1)}{(\text{.delta.} \cdot \text{.epsilon.})} \right]$  and considering that in the embodiment shown,  $l$  is equal to 4,760 bits,  $\text{.delta.}$  is equal to the data rate of 44.736 Mb/s which leaves two variables  $\text{.eta.}$  and  $t$ .  $\text{.eta.}$  can be determined with reference to confidence factor desired in declaring a channel degraded to the bit error rate threshold; for example if  $\text{.eta.} = 10$  and  $\text{.delta.} = 44.760$  Mb/s, then  $t$  is  $\approx 2.26$  sec. and  $\text{.epsilon.} = 10^{\text{sup.} - 7}$  which is the bit error rate threshold to sense an alarm which will be declared the first time with a probability of 50%. Once an alarm is declared there has to be some hysteresis built in the circuit in order to avoid oscillations. This is accomplished by then setting  $\text{.eta.} = 3$  and using  $\text{.nu.} = \left[ \frac{(\text{.eta.} \cdot 1)}{(\text{.delta.} \cdot \text{.epsilon.})} \right]$  with the other circuit equation parameters remaining the same, then  $\text{.epsilon.}$  would be equal to  $0.3 \cdot 10^{\text{sup.} - 7}$  bit error rate threshold necessary to release an alarm.

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L2: Entry 8 of 8

File: DWPI

Feb 25, 2003

DERWENT-ACC-NO: 2003-428631

DERWENT-WEEK: 200340

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TITLE: Iterative decoding method involves terminating iterative decoding based on relative maximum bit error rate or minimum error difference between current and previous iteration

Basic Abstract Text (1):

NOVELTY - The parity value of the decoded data is calculated and compared with the decoded error detection information to determine if the parity value passes a cyclic redundancy check (CRC). The iterative decoding is terminated, based on the relative maximum bit error rate or the minimum error difference between the current and previous iteration.

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L2: Entry 17 of 18


File: EPAB

Aug 10, 1994

DOCUMENT-IDENTIFIER: EP 609595 A1

TITLE: Method and apparatus for verifying CRC codes.

Abstract Text (1):

CHG DATE=19990617 STATUS=O> Apparatus for verifying a CRC code of a message transmitted as a succession of sub-blocks comprises dedicated hardware including a linear feedback shift register (14) for deriving a 'partial' CRC code for each individual sub-block. These partial CRC codes are held in a store (16) for subsequent combination under software program control. The combination is performed in a iterative manner, each partial CRC code being added modulo 2 to values selected from look-up tables in accordance with the result of the previous step of the iteration. The division of the CRC verification into two operations and the use of pre-calculated look-up tables facilitate the efficient, simultaneous reception of many messages having interleaved sub-blocks without incurring serious time penalties. 

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**1 Switched Viterbi equalisation of dynamic channels and a degenerative error mode**

*Boyle, M.R.; Fagan, A.D.;*

EUROCON'2001, Trends in Communications, International Conference on. , Volume: 1 , 4-7 July 2001

Pages:18 - 21 vol.1

[\[Abstract\]](#)   [\[PDF Full-Text \(436 KB\)\]](#)   **IEEE CNF**

**2 Viterbi decoding with per-survivor processing of adaptive array antenna**

*Uchiki, T.; Kojima, T.; Miyake, M.;*

Vehicular Technology Conference Proceedings, 2000. VTC

2000-Spring Tokyo. 2000 IEEE 51st , Volume: 2 , 15-18 May 2000

Pages:1295 - 1299 vol.2

[\[Abstract\]](#)   [\[PDF Full-Text \(380 KB\)\]](#)   **IEEE CNF**

**3 Optimization of azimuth angle and other geometrical parameters in digital tape recording**

*Wong-Lam, H.W.; Rijckaert, A.;*

Magnetics, IEEE Transactions on , Volume: 31 , Issue: 1 , Jan 1995

Pages:917 - 922

[\[Abstract\]](#)   [\[PDF Full-Text \(428 KB\)\]](#)   **IEEE JNL**

**4 Detection of errors recovered by decoders for signal quality estimation in rain-faded AWGN satellite channels**

*Celandroni, N.; Rizzo, S.T.;*

Communications, IEEE Transactions on , Volume: 46 , Issue: 4 , April 1998



Pages:446 - 449

[\[Abstract\]](#) [\[PDF Full-Text \(120 KB\)\]](#) **IEEE JNL**

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**5 Adaptive differential detection for M-ary DPSK**

*Adachi, F.;*

Communications, IEE Proceedings- , Volume: 143 , Issue: 1 , Feb. 1996

Pages:21 - 28

[\[Abstract\]](#) [\[PDF Full-Text \(724 KB\)\]](#) **IEEE JNL**

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**6 Efficient source and channel coding for progressive image transmission over noisy channels**

*Zaibi, S.; Kerbaol, V.;*

Global Telecommunications Conference, 2002. GLOBECOM '02. IEEE , Volume: 1 , 17-21 Nov. 2002

Pages:529 - 533 vol.1

[\[Abstract\]](#) [\[PDF Full-Text \(415 KB\)\]](#) **IEEE CNF**

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**7 Making the most out of spectral redundancy in GSM: cheap CCI suppression**

*Gardner, W.A.; Reed, C.W.;*

Signals, Systems and Computers, 2001. Conference Record of the Thirty-Fifth Asilomar Conference on , Volume: 1 , 4-7 Nov. 2001

Pages:883 - 889 vol.1

[\[Abstract\]](#) [\[PDF Full-Text \(497 KB\)\]](#) **IEEE CNF**

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**8 Performance of ML rate determination for an IS-95 downlink SIC receiver**

*Cagley, R.E.; Lai, K.-C.; Shynk, J.J.;*

Signals, Systems and Computers, 2000. Conference Record of the Thirty-Fourth Asilomar Conference on , Volume: 2 , 29 Oct.-1 Nov. 2000

Pages:956 - 959 vol.2

[\[Abstract\]](#) [\[PDF Full-Text \(284 KB\)\]](#) **IEEE CNF**

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**9 An architecture of decision feedback differential phase detection of M-ary DPSK signals**

*Changkon Kim; Jiyong Yoon; Jong-Wha Chong;*

TENCON 99. Proceedings of the IEEE Region 10 Conference , Volume: 1 , 15-17 Sept. 1999

Pages:49 - 52 vol.1

[\[Abstract\]](#) [\[PDF Full-Text \(240 KB\)\]](#) **IEEE CNF**

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**10 Performance of a d=0 Demod/Remod detector with partial erasure matching**

*Reed, D.E.; Sundell, L.C.;*

Magnetics, IEEE Transactions on , Volume: 33 , Issue: 5 , Sept. 1997

Pages:2803 - 2805

[\[Abstract\]](#) [\[PDF Full-Text \(300 KB\)\]](#) **IEEE JNL**

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**11 Comparison of different detection techniques for digital magnetic recording channels**

*Han, K.; Spencer, R.;*

Magnetics, IEEE Transactions on , Volume: 31 , Issue: 2 , Mar 1995

Pages:1128 - 1133

[\[Abstract\]](#) [\[PDF Full-Text \(408 KB\)\]](#) [IEEE JNL](#)

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**12 Error correcting coding of a 220 Mbit/s coherent optical communication channel**

*Castagnozzi, D.M.; Alexander, S.B.; Colagiuri, E.P.; Bucher, E.A.; Jeromin, L.L.;*

Electronics Letters , Volume: 26 , Issue: 16 , 2 Aug. 1990

Pages:1288 - 1290

[\[Abstract\]](#) [\[PDF Full-Text \(228 KB\)\]](#) [IEEE JNL](#)

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**13 Optimal detection of discrete Markov sources over discrete memoryless channels-applications to combined source-channel coding**

*Phamdo, N.; Farvardin, N.;*

Information Theory, IEEE Transactions on , Volume: 40 , Issue: 1 , Jan. 1994

Pages:186 - 193

[\[Abstract\]](#) [\[PDF Full-Text \(708 KB\)\]](#) [IEEE JNL](#)

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*Nan-Hsiung Yeh; Wachenschwanz, D.; Mei, L.;*

Magnetics, IEEE Transactions on , Volume: 35 , Issue: 2 , March 1999

Pages:776 - 781

[\[Abstract\]](#)   [\[PDF Full-Text \(460 KB\)\]](#)   **IEEE JNL**

**2 Parallel structures for joint channel estimation and data detection over fading channels**

*Omidi, M.J.; Gulak, P.G.; Pasupathy, S.;*

Selected Areas in Communications, IEEE Journal on , Volume: 16 , Issue: 9 , Dec. 1998

Pages:1616 - 1629

[\[Abstract\]](#)   [\[PDF Full-Text \(376 KB\)\]](#)   **IEEE JNL**

**3 Detection of errors recovered by decoders for signal quality estimation on rain-faded AWGN satellite channels**

*Celandroni, N.; Rizzo, S.T.;*

Communications, IEEE Transactions on , Volume: 46 , Issue: 4 , April 1998

Pages:446 - 449

[\[Abstract\]](#)   [\[PDF Full-Text \(120 KB\)\]](#)   **IEEE JNL**

**4 Adaptive phase diversity for MDPSK reception**

*Adachi, F.;*

Communications, IEEE Proceedings- , Volume: 143 , Issue: 5 , Oct. 1996

Pages:267 - 272

[\[Abstract\]](#) [\[PDF Full-Text \(540 KB\)\]](#) **IEE JNL**

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**5 The computer simulation of a high speed data transmission system for use over high frequency radio links**

*Tsabieris, N.I.;*

Computer Modelling of Communication Systems, IEE Colloquium on , 1994

Pages:6/1 - 6/5

[\[Abstract\]](#) [\[PDF Full-Text \(280 KB\)\]](#) **IEE CNF**

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, Nov. 2001  
Pages:2972 - 2982[\[Abstract\]](#)   [\[PDF Full-Text \(446 KB\)\]](#)   **IEEE JNL****2 Comparison of different detection techniques for digital magnetic recording channels***Han, K.; Spencer, R.;*Magnetics, IEEE Transactions on , Volume: 31 , Issue: 2 , Mar 1995  
Pages:1128 - 1133[\[Abstract\]](#)   [\[PDF Full-Text \(408 KB\)\]](#)   **IEEE JNL****3 A model of subjective reliability analysis***Onisawa, T.;*Fuzzy Systems, 1993., Second IEEE International Conference on  
, 28 March-1 April 1993  
Pages:756 - 761 vol.2[\[Abstract\]](#)   [\[PDF Full-Text \(404 KB\)\]](#)   **IEEE CNF**